

## **Factors affecting the length of hospitalization in people diagnosed with anorexia nervosa – study review**

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### **Summary**

Anorexia nervosa is a physical and mental health condition with high mortality and long-term history. Its most characteristic symptom is a significant underweight caused and maintained by a patient who is perceived as an obese person and sets a low weight limit. The course of treatment is usually long-term, involving a large group of specialists, and, depending on the patient's condition, outpatient care, day care or – in the event of high weight loss or malnutrition complications – hospitalization for several months is necessary. Currently, there is a tendency to shorten the length of stay in the inpatient ward of patients with AN in favor of other forms of care. The aim of this article is to collect and present the results of a small number of studies on factors affecting the length of hospitalization in the treatment of anorexia nervosa. Based on the currently available tests, the body mass index at admission should be considered as a factor significantly affecting the length of hospitalization. However, the discussion remains open and further research in this area is advisable. Clarification of the above issue may provide the basis for a more patient-oriented determination of the duration of hospital treatment. Further research on factors identified in individual studies and their relationships will also be needed.

**Key words:** anorexia nervosa, length of stay, predictors

### **Introduction**

Eating disorders are physical and mental health conditions with complicated and complex mechanisms, and many different factors, including genetic susceptibility, socio-cultural and family factors, may be involved in their etiology. Among this group of disorders, anorexia nervosa (AN) is distinguished by its long-term course and high mortality. Most often it concerns people during adolescence, with a predominance of female sex, and its prevalence is estimated at 0.51 to 3.7% throughout life. In the di-

agnostic criteria according to ICD-10 [1] and DSM-5 [2], the definition of the disorder emphasized above all the importance of insufficient body weight, which was caused by the insufficient energy supply imposed by the patients in connection with the perception of themselves as obese. The AN treatment process is usually long-lasting and usually covers a wide range of therapeutic interventions, and the discussion about choosing the most appropriate combination of therapeutic agents and the ideal duration of treatment remains open. In certain circumstances, e.g., in life-threatening somatic complications or inadequate outpatient care, hospitalization is necessary. At the same time, treatment in the conditions of the stationary psychiatry ward is widely considered to be one of the more expensive and time-consuming types of medical care [3].

In many countries, there is a tendency to reduce the time of hospitalization of patients with AN in favor of other forms of care, which are considered less expensive and more cost-effective [4, 5]. At the same time, the fact that a shorter hospital stay lowers the costs of only current treatment, but it is financially unviable in the long term, is emphasized [4, 6]. When analyzing data on the length of hospitalization, one cannot fail to notice the phenomenon of early termination of hospital treatment (drop out) among patients with eating disorders [7]. Patients with AN often have a negative attitude towards treatment and equally often give it up (20%–51% of patients), research also shows that this percentage increases [8].

In the light of the information presented above, the expected length of hospitalization is shown as an interesting research objective. Recognition of factors affecting the length of hospitalization can allow the creation of therapeutic strategies owing to which the phase of the illness requiring hospital treatment may be safely shortened.

The literature review from 1950–2019 we used the Pubmed, Wiley Online Library, Embase, and Scopus databases with the following key words: anorexia nervosa (AN), inpatient, hospitalization, length of stay (LOS), drop out, predictors. We identified nine studies [3, 9–16] assessing the impact of various factors on the length of hospitalization of patients with anorexia nervosa and one [17] which aimed to identify predictors of the total costs of hospitalization of patients with anorexia nervosa. The authors of the last study emphasize that the anticipated costs of hospitalization are closely related to LOS. The article does not refer to studies analyzing factors affecting the premature termination of hospitalization. The review of findings is descriptive in connection with the large variety of analyzed groups, treatment approaches, and the types of factors considered as predictors.

### **Length of stay (LOS)**

The prognosis of hospital stay in patients diagnosed with AN has been the subject of a small number of studies taking into account a significant number of variables. According to Huntley et al. [18], factors affecting the time of inpatient anorexia treatment can be divided into three groups: (1) related to the healthcare system, (2) related

to the patient and (3) related to the treatment itself. Other studies classify the variables depending on the time of treatment as (1) known before the beginning of hospital stay, (2) known at the beginning of hospitalization and (3) those that emerge during hospitalization.

### Methodological differences in the analyzed studies

The analyzed works are characterized by different research methodology. The most important differences are related to the number of assessed groups, age of patients at the time of admission to the hospital, body mass index BMI or %IBW (% Ideal Body Weight, i.e., the percentage excess or deficit of ideal body weight, assuming that 100% is ideal), as well as the duration of the illness.

Of ten analyzed studies, four were multicenter studies [10, 11, 14, 16], while the others were single-center projects. The number of enrolled patients ranged from 55 [9] to 1,112 [11]. In the last study, the number of patients with AN was 338, with bulimia (BN) 605, with AN and BN – 169. This is one of two studies [11, 14] in which patients with non-AN diagnosis were included in the analysis. In addition, only patients with the AN restriction subtype were enrolled in one study [17]. Due to the fact that the statistical power of the test depends on the number of surveyed people, the results of work with too few participants may not be reliable. Four studies included patients of both sexes [9, 11, 14, 17], the others only women.

The age of patients at the beginning of hospitalization also varied, not all studies reported mean age of participants. It is worth noting that factors affecting the duration of hospitalization may vary depending on age. This may be particularly important for underage patients who cannot make their own hospitalization decisions. Ultimately, two studies concerned only adolescent patients [12, 15], five only adults, and three studies [3, 9, 14] concerned both adult and teenage patients.

The body mass index (BMI) or % ideal body weight (%IBW) on admission was also different for individual studies. The average BMI at the beginning of hospitalization ranged from 13.1 kg/m<sup>2</sup> (*SD* = 1.71 kg/m<sup>2</sup>) [14] to 15.8 kg/m<sup>2</sup> (*SD* = 1.3 kg/m<sup>2</sup>) [17]. In two studies, the % ideal body weight (% IBW) was used [9, 11]. The range of BMI on admission suggests different severity of symptoms in patients, hence it can be concluded that other factors may influence the length of hospital treatment in patients with different clinical profiles and severity of symptoms. Patients who have lower body weight at the start of treatment may need longer hospitalization. On the other hand, it should be noted that the lower mean age of patients at admission may be partly responsible for the lower average BMI values at the beginning of hospitalization.

Differences in studies also concerned the duration of anorexia nervosa symptoms upon admission to the department. For example, in the study of Morris et al., the average duration of the illness in adolescents was 15.1 months (range 0–36 months), and in adults: 9.7 years (range from 6 months to 35 years) [14]. In other studies, these values

ranged from 20.3 months ( $SD = 17.2$ ) [3] to 9.3 years [16] (no standard deviation was given). The duration of symptoms is most likely related to both the severity of the disorder and the age of the patients (younger patients get better sooner). The longer duration of AN at admission to the hospital also suggests that such patients did not respond to other forms of treatment or were already hospitalized but without a lasting therapeutic effect.

In the first study devoted to the discussed issue, carried out by the team of Nozoe et al. [9], the diagnosis was established retrospectively, in accordance with the diagnostic criteria DSM-III-R, in others DSM-IV or ICD-10 [14] was used. The time to enroll in the study also varied from study to study: from 24 months in the multicentre study [14] to 16 years in the study of Nozoe et al. [9]. Making comparisons with respect to studies with such different time of enrolling participants is problematic, as the long recruitment time increases the likelihood of significant influence of factors associated with the treatment protocol and its changes on therapeutic results. The studies also used various inclusion and exclusion criteria as well as discharge criteria. The mean treatment duration ranged from 28 days ( $SD = 24.6$ ) [17] and 28.5 days ( $SD = 12.3$ ) [12] to 141.4 days ( $SD = 125.7$ ) depending on the study [14].

However, the greatest differences between the studies concerned mainly the type of treatment offered to patients. Six studies precisely described the therapeutic program [3, 9, 12, 13, 15, 16], with 4 centers [9, 13, 15, 16] applying the principles of cognitive behavioral therapy, and 2 [3, 11] applying psychodynamic treatment program. In three studies, the expected rate of weight gain of patients was given: 500 g/week (at caloric value initially 1000/1200 kcal/day, then 1800–2000 kcal/day) [9], 700–1000 g/week [15] and 600–1000 g/week [16] – in the case of the last two studies no principles regarding caloric intake of meals were presented).

#### Analyzed factors and relationships with the length of hospitalization

All of these studies assessed the potential relationship of length of stay (LOS) with body mass indexes (BMI or %IBW) and the patient's age on admission. Interestingly, only one study [9] showed that the patient's age at the time of hospitalization was a statistically significant factor related to the prolongation of hospitalization – the older age at the time of admission to the hospital corresponded to a longer stay. Three studies [10, 16, 17] found a significant relationship between the length of hospitalization and BMI – lower BMI on admission was associated with longer hospitalization. Another three studies [11, 13, 15] showed that a longer hospital stay was significantly associated with the observed greater range of changes in the BMI of patients.

Several studies [3, 10, 13, 15, 16] analyzed the significance of the recognized subtype of eating disorders (restrictive/purging or atypical/typical), as well as the presence in the clinical picture of binge eating and/or provoking vomiting, laxatives and/or diuretics abuse [9] or abuse of dietetic agents [10]. Only one study [16] showed that

the AN purging subtype was significantly associated with longer treatment duration. Similarly ambiguous results are provided by studies assessing the relationship between the length of hospitalization and the severity of eating disorder symptoms measured by questionnaire methods [11–16]. Only in two studies it was shown that a greater severity of symptoms at admission was associated significantly with a longer duration of treatment [11, 16], and in one it was shown that a shorter stay was associated with a significant change in the severity of symptoms measured using the *Eating Disorders Inventory* EDI-2 [15].

Six studies [3, 9, 11, 13–15] evaluated the time elapsed from the first symptoms to the time of hospitalization, and one [15] assessed the fact that participants had undergone previous outpatient treatment. Only in one study [3] it was found that the hospitalization duration was significantly longer in the case of longer duration of AN symptoms. Moreover, the minimum body weight recorded during the illness (defined as the %IBW index) [3, 9, 10] turned out to be a statistically significant factor associated with the prolonged hospitalization time in only one of the observations [9]. Five studies [3, 9, 10, 13, 16] analyzed the age of onset of symptoms of the disorder, while their results do not indicate statistically significant relationships.

The factors related to the course and treatment of anorexia nervosa were also: the presence of menstruation [3, 10], the need for pharmacotherapy [13, 15], the presence of irregularities in additional tests (including ionogram, assessment of kidney and liver function, ECG) [10], the time elapsed between the first symptoms of the illness and the first consultation, the need to transfer the patient to the intensive care unit during hospitalization, the amplitude of the therapeutic contract and its implementation [3], and feeding with a nasogastric tube during hospitalization [3, 14]. In the latter case, a relationship with the duration of hospitalization was found – patients who required tube feeding were hospitalized much longer compared to those who did not require such procedure.

In all of the discussed studies [3, 9, 10–17] the significance of co-occurrence of other disorders or symptoms of mental disorders was assessed, and in five studies [11–14, 16] the assessment was carried out using questionnaire methods. Only one study [3] showed a longer hospitalization period due to the coexistence of mood, anxiety or personality disorders (without significant differences between them). In another study [17], the presence of disorders of adult personality and behavior (including diagnoses according to ICD 10: other schizophrenia F20.8, emotionally unstable personality disorder F60.3, other specific personality disorders F60.8, other personality disorders F61, other symptoms and signs involving emotional state R45.8, other problems related to lifestyle Z72.8) have been associated with a significant increase in treatment costs, which may mean a longer hospitalization period.

Other analyzed factors include the level of patient cooperation and compliance, readiness to change and motivation [3, 10, 11, 12, 15, 16]. Only in one study [3] the

duration of hospital stay was significantly shorter in the case of good cooperation with the patient (defined as fulfillment of the contract between the patient, his/her family and staff regarding contact with the outside world during hospitalization and target body weight). One study [12] found that participants with a higher level of readiness for change were hospitalized for a much shorter period of time.

Except for one study [17], all assessed possible effects of the number of previous psychiatric hospitalizations on the length of the current stay. Only in one study [10], in relation to persons hospitalized for the second or third time, a significantly longer duration of stay was found compared to those who were hospitalized for the first time or more than three times. Type of hospital in which the patient was hospitalized (criteria were the method of financing and therapeutic interventions program), assessed as a potential factor in three studies [10, 11, 14], proved to be significant only in one study [11] – patients in hospitals with a separate department for eating disorders were treated for an average of 7 weeks longer compared to a hospital specializing in eating disorders. In addition, in the case of patients referred for involuntary treatment, a significantly longer period of stay in the ward was noted compared to patients treated voluntarily [14].

Factors such as the patient's level of education [3, 10, 16], socio-economic status [3], relationship between the patient and other family members [9, 11, 13], psychological problems in a family history [13], living alone or far away from family [3, 9, 12, 13, 16], having a partner [16], patient's occupation [10, 13], patient's marital status [10, 13], distance from the place of residence to the hospital [3, 10], history of thefts [3, 9], poor social adaptation defined as a refusal to go to school or work, or being unemployed before the onset of the illness [9] did not have a significant impact on the duration of hospitalization in the cited studies.

### Conclusions from the research

Based on the analyses presented above, it can be assumed that the results obtained in the discussed studies are not consistent and unambiguous, which can be explained by the fact that the length of hospitalization depends on many variables, as well as the methodological differences of the conducted research. It is worth emphasizing, however, that predictor data that could be reliably replicated could have huge clinical relevance regardless of variables related to healthcare system or principles.

The current analysis showed that patients with longer hospitalization periods had lower body mass index on admission, which seems clinically reliable, since these patients probably present a group with more severe symptoms. However, the patient's age at admission significantly predicted LOS in only one study [9].

The significant relationship between the lower BMI at admission and the length of hospitalization is quite obvious. The main goal of hospital procedures in AN is weight gain, and patients with low BMI may be encouraged to stay longer, which is

also confirmed in the first study on the subject [9], where it was observed that LOS was affected by lower body weight on admission to the hospital. On the other hand, weight at admission to the hospital is closely related to the undertaken therapeutic procedures (e.g., realimentation is carried out in such a way that the caloric value of meals increases as the patients stay in the hospital, which means that in the case of patients with greater weight loss more time is needed to reach target weight). However, not all studies confirm these observations. For instance, in the study of Strik Lievers et al. [3] minimal BMI since the onset, admission BMI and body weight amplitude were not significantly related to the length of hospitalization. Perhaps the above differences can be explained by the use of different therapeutic procedures. In turn, Nozoe et al. [9] studied patients undergoing behavioral therapy whose duration of stay depended strictly on weekly weight gain (hence it can be assumed that a patient with lower BMI on admission probably needed longer hospitalization). In turn, in the study of Lievers et al. [3] target body weight was determined by taking into account appropriate weight of the patient, the maximum weight of the patient in the past and the wishes of the patient and his/her parents, and the length of hospitalization was not determined on admission and depended on the patient, who was discharged after reaching the final target weight.

Weight gain is often a criterion for discharge from hospital departments. It should be noted, however, that currently patients are often discharged much faster and with lower body weight. For example, Wiseman et al. [4] observed a reduction in the average length of stay due to eating disorders of patients hospitalized during 14 years, from 149.5 days in 1984 to 23.7 days in 1998. This was accompanied by a parallel decrease in BMI in people with anorexia nervosa at discharge, from 19 to 20 before 1995 to an average of 17.7 in 1998. The average BMI for the latter at admission did not change. The same authors have shown that the likelihood of relapse and readmission increases with a decrease in % of ideal body weight at discharge [4].

In the face of the phenomenon of shortening hospital stays, it is worth paying attention to the many dangers arising from the tendency to accelerate weight gain during hospitalization. Slowly increasing the caloric content of meals (starting from about 1200 kcal/day or less) is aimed at minimizing the risk of complications, but it is associated with slow weight gain, which has contributed to a change in clinical practice and studies on higher caloric intake during hospitalization. These changes are reflected in the results of a systematic review of studies on the weight rehabilitation of patients hospitalized for anorexia nervosa made by Garber et al. [19], which analyzed the literature from 1960 to 2015 (a total of 22 publications). The authors observed that from 2010, in 10 of the analyzed studies, realimentation began with the caloric value of meals of 1400 kcal/day. Only two studies used low calorie meals, also in severely malnourished patients (BMI <15 kg/m<sup>2</sup> in adults or BMI <70% of median BMI expected in relation to height in adolescents). At the same time, clinicians and researchers remind about both physical and mental complications associated with rapid weight recovery.

Nozoe et al. [9] are in favor of prolonged hospital treatment of people with severe anorexia nervosa symptoms, stressing that such patients have far more difficulty in accepting their target body weight and show a higher level of anxiety as discharging approaches. Commerford et al. [20] recommend that patients with anorexia nervosa maintain a target body weight for at least two weeks before the end of hospitalization.

Garber et al. [19] emphasize, however, that treatment programs with lower caloric value of meals and its slow increase may play a greater role in severely malnourished (BMI <15 kg/m<sup>2</sup>) and chronically ill patients, while higher caloric value of meals may bring faster effect in a significant percentage of patients with moderate malnutrition (BMI of 75–85% of the norm) and with a shorter AN course. In addition, they highlighted in the conclusions that weight rehabilitation based on oral nutrition and the use of additional methods such as gastric feeding results in similar weight gain. It should be recalled here that in the studies mentioned earlier [3, 14] it was observed that the use of an intragastric tube, significantly increases the hospitalization period. Ultimately, however, although the use of probe-feeding leads to faster weight gain, the very need to implement such intervention suggests a more serious course of the illness and the inability to obtain satisfactory physiological weight gain. This finding is quite obvious, as it should be assumed that patients requiring gastric feeding are more resistant to treatment.

The patient's age at admission, which is a frequently examined variable, turned out to be predictive only in one study [9]. While discussing its results the authors emphasized that older patients may be less susceptible to treatment possibly due to the chronic course of the illness. They need more time to accept the need for treatment, which leads to a longer stay in the hospital. In the analyzed group, many older patients did not agree to medical advice and tended to refuse treatment in the early stages of hospitalization. In addition, the study authors emphasize that older patients tend to discontinue hospital treatment at an early stage – patients who achieved <66.7% of ideal body weight or were older than 20 years were significantly less cooperative. In addition, a positive correlation was demonstrated between the age of onset and age at admission and between the age at admission and the duration of the illness prior to admission. These results are associated with the observations of the next two studies. In the study of Strik Lievers et al. [3], the hospitalization period was significantly longer for a longer duration of AN, the study of Maguire et al. [10] showed a relationship between the length of stay and the number of previous hospitalizations (2<sup>nd</sup> and 3<sup>rd</sup> hospitalization was associated with a longer stay). The disorder of longer duration is usually more symptomatically complicated, less easily susceptible to therapeutic intervention, which may also mean more unsuccessful treatment attempts.

In three of the discussed studies [11, 15, 16], the length of hospitalization was related to the severity of symptoms, while in two studies [3, 17] it was related to the presence of other comorbidities, which of course seems clinically reliable, since these



groups of patients may require additional treatment time. The presence of comorbid disorders is a negative prognostic factor for the course of anorexia nervosa, making AN not the only treatment goal. Moreover, additional problems may impede the rehabilitation of body weight, thus extending hospitalization. In addition, two studies [3, 12] showed that patients with a high level of motivation to work and complying with contract rules were hospitalised for a shorter period of time. Such results supplement the information suggesting that the patient's level of motivation can be used as a factor to monitor the progress of treatment.

None of the studies showed relationships between the length of hospitalization and variables such as education, socio-economic status, having a partner, living alone, or the presence of mental disorders in the family. Considering the above, it can therefore be assumed that the so-called factors known at the beginning of hospitalization, such as body mass index, possibly the level of severity of symptoms and motivation to work, and factors emerging during hospitalization, such as the degree of contract fulfillment, may affect the length of hospitalization. Moreover, the identification of patients with longer duration of AN symptoms before hospitalization creates the opportunity to inform the patient and his/her family about the possible longer hospitalization period, which can improve cooperation.

### **Recapitulation**

The issue discussed above is part of a very scientifically, socially and economically important debate. The duration of hospitalization and its possible premature termination have serious clinical consequences, and the identification of possible risk factors can support the selection of specific therapeutic measures to improve treatment. Further research is advisable, also taking into account the phenomenon of premature discharge from the hospital (drop out) and the awareness that the test results will always be to some extent estimated, since it is currently not possible to routinely control all elements of treatment – medical ones, those related to the treatment program, nutritional, pharmacological or psychosocial ones.

The results of studies concerning predicting the duration of hospitalization may facilitate the diagnosis of patients who require a longer stay in the hospital. This can enable optimization and individualization of treatment, as well as improve cooperation with the patient (informing patients about the likely course of treatment). In turn, the improvement in the effectiveness of interventions can undoubtedly translate into a reduction in the cost of care and allow for faster, satisfactory and full functioning of the patient.

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